

DEPARTMENT OF ECOLOGY

December 15, 2005

TO: MTCA SAB

FROM: Pete Kmet, P.E.
Craig McCormack, Toxicologist

SUBJECT: API Fish Consumption Rate*

At the November 18, 2005 SAB meeting, Lon Kissinger, a Toxicologist at EPA Region 10, presented information on behalf of Ecology and EPA addressing proposed changes to the MTCA fish consumption rate in the Duwamish River and Elliott Bay. Specifically, the recommendations the Board were asked to comment on are as follows:

To protect the API population who may eat fish harvested from the Duwamish River and Elliott Bay, the MTCA surface water cleanup level equation for sites that contribute contaminants to these water bodies should be modified as follows:

1. Replace the MTCA fish consumption rate of 54 g/day and fish diet fraction of 0.5 (effective consumption rate of 27 g/day) with an effective fish consumption rate of 57 g/day (derived using the fraction of fish harvested from King County by APIs) and a fish diet fraction of 1.0.
2. Use an average body weight for the API population of 63 kg, derived from the Schena et al. 1999, study.

At that meeting the Board raised a number of questions and issues regarding these recommendations. This memo is intended to address these points. To facilitate Board discussions, the questions have been grouped into broader policy issues and study-specific questions.

Policy Issues

1. Why has Ecology focused on a fish consumption rate for protection of API populations in the Elliott Bay and Duwamish River area?

- The particular site that triggered this discussion is the Philip Services Corporation facility in the Georgetown area of Seattle. The SAB discussion is triggered under WAC 173-340-708(10)(b) as it applies to that site. However, because there are numerous other cleanup sites releasing contaminants to these waters, Ecology believes it is appropriate for the SAB to consider this rate in light of that larger context.

* NOTE: As used in this memo "fish" includes both fish and shellfish.

- There is a substantial population of persons of Asian and Pacific Islander (API) origin that reside in the vicinity of the Duwamish River and Elliott Bay
- The API population in this area may be exposed to facility-related contamination through other exposure routes and knowing the exposure through fish consumption will be helpful in assessing total site risk
- There is well-documented evidence that these API populations consume substantially more fish than the MTCA default fish consumption rate used to calculate surface water cleanup levels and that a substantial amount of this fish is harvested from water bodies in King County
- API populations tend to consume fish species that reside locally in these waters. They often consume different parts of fish than the general U.S. population and use different cooking practices. This potentially leads to higher exposure to accumulated contaminants
- Excellent information is currently available on API fish consumption from King County sources from a UW study done in 1999 (Sechena et. al., 1999)

2. Why hasn't Ecology taken a broader look to consider other exposed populations such as homeless/subsistence individuals and tribes in the Duwamish River and Elliott Bay?

- With regard to homeless individuals, there is no study available on which to base a fish consumption rate. Note that from the reported fish consumption rates, it appears that at least one subsistence fisher was included in the API survey.
- While there have been several studies of tribal fish consumption in recent years, there is currently no consensus on an appropriate fish consumption rate to use to protect tribal members. A formal consultation process for developing seafood consumption exposure parameter values to assess risks to tribes at Puget Sound RCRA and Superfund sites been underway between EPA (on behalf of the federal government) and Tribal governments for approximately one year. Ecology is waiting for the results of that consultation. EPA has a goal of completing that process early in 2006 but given the nature of that process and complexity of the issues, including varying fish consumption practices among tribes, it could be much longer before this process reaches a conclusion.
- It should be noted that the lower Duwamish waterway is being used as a pilot site for the federal consultation process. This process is ongoing between EPA and the Muckleshoot and Suquamish Tribes. Upon completion of that process, the results would need to be considered in any decisions Ecology makes on sites encompassed by that agreement, and may require additional discussion with the SAB.
- Ecology believes that it would be irresponsible to delay a decision on the API community to wait for tribal fish consumption rates to be resolved. This also could violate Ecology's internal directives for consideration of environmental justice in our work.

3. From a practical perspective, how will these recommendations influence decisions on cleanup sites impacting the Duwamish River and Elliott Bay?

- Under MTCA, any site that directly releases hazardous substances to surface water or indirectly through ground water typically needs surface water cleanup levels to assess site impacts and enable selection of a remedy. The proposed recommendations would approximately double the fish consumption rate used in surface water cleanup level calculations under MTCA, potentially halving the cleanup level. The actual impact of these recommendations on cleanup levels at a specific site will vary from site to site. This is because the process of setting cleanup levels under MTCA involves consideration of many factors including applicable federal and state laws, laboratory capabilities to measure low concentrations, bioconcentration factors for individual chemicals, and exposures to multiple chemicals and pathways.
- As noted above, EPA is currently seeking agreement with tribes on a fish consumption rate for RCRA and Superfund sites in the lower Duwamish waterway. Preliminary indications are that this rate will be well in excess of that needed to protect the API population. If that is the case, at sites encompassed by that agreement, the tribal rate could result in surface water cleanup levels lower than those derived using an API-based consumption rate. However, it is still important to develop an API rate to enable evaluation of: a) whether a tribal rate will be protective of the API population that uses these resources; b) areas not encompassed by the tribal rate; c) cumulative risks to local APIs; and d) risks to APIs eating fish from these water bodies that may be different than those species used to derive the tribal rate.

4. Is it Ecology's intent to apply the recommended fish consumption rate from these discussions to MTCA sites located elsewhere in WA State?

- Not at this time. While information in the Sechena et. al, study will be useful in determining fish consumption rates for API populations in other parts of WA State, a number of factors would need to be considered in applying this study in this way.
- For example, the fish models used and the questions asked were primarily directed towards determining consumption rates for marine and estuarine organisms. While some freshwater fish consumption data was obtained, additional analysis would be needed to apply this information to develop a freshwater fish consumption rate.
- Ecology is interested in learning other factors the SAB recommends considering in applying this study to other areas of the state—either marine or freshwater.

Study Specific Questions and Request for SAB Input:

5. Does the Sechena et. al., 1999 study provide a valid basis for estimating fish consumption rates for API populations in King County?

Ecology believes this study is appropriate for estimating fish consumption rates for API populations in King County for several reasons:

- The study was subjected to review by a highly credentialed technical steering committee consisting of individuals from the University of Washington, USEPA, Ecology, WA State Dept. of Health and others
- The study had broad participation and support from the local community and used interviewers that were trusted members of the ethnic communities being surveyed; addressing the issue of fear of authority and language issues affecting accurate data collection.
- Use of personal interview, rather than creel survey methodology
- Interviewers were trained
- The survey was piloted tested and refined prior to broader use
- Participants were randomly selected from locally identified groups

❖ Does the SAB concur that the Sechena et. al., 1999 study provides a reasonable scientific basis for estimating Duwamish River and Elliott Bay fish consumption rates for API populations?

5. How was use of cooked tissue weights associated with models addressed in utilizing the study results to derive an API uncooked seafood consumption rate?

- For most species included in the survey, the raw uncooked portions were used to develop models used in the interview process. Data from this part of the survey was used as is—with no correction for cooking practices.
- For crab, the models used in the interviews consisted of portions extracted from the shells through cooking. A correction factor of 18% weight loss through cooking was used in the calculations. This correction factor was derived from data included in the API study.
- For shellfish, a correction factor of 25% and 50% loss in weight through cooking was used in the calculations. These factors bracket the range of values reported in the literature.
- For both crab and shellfish, these correction factors result in a slightly higher calculated fish consumption rate than if the raw uncooked weight were used.

❖ Does the SAB concur that cooked tissue model weights have been appropriately considered in utilizing the study results to derive an API fish consumption rate?

6. Is pooling of the data from all ethnic groups surveyed appropriate and adequately protective of the different ethnic groups?

Sechena, et. al., considered this question at length in the original study. In that study, they stated the following:

While the observed consumption rates have been reported for each ethnic group in this study, it is important to note that the estimate of consumption rate for any specific ethnic group should not be considered accurate because of the small sample size for the individual ethnic groups.

Indeed, the number of individuals interviewed for all of the ethnic groups was rather small, as illustrated in the following table:

Ethnicity	Sample Size	Puget Sound Consumers
Cambodian	20	11
Chinese	30	16
Filipino	30	14
Hmong	5	4
Japanese	29	12
Korean	22	10
Laotian	20	12
Mien	10	9
Samoan	10	2
Vietnamese	26	9
Total	202	99

One way to examine this question is to look at plots of the amount of fish consumed by the various subgroups.

Figure 1 shows the average and standard deviation of fish consumption rates of all individuals, sorted by ethnic group surveyed.

Figures 2 and 3 show the average and standard deviation of fish consumption rates of all individuals reporting consuming fish from local waterways, sorted by ethnic group surveyed. A 25% cooking correction factor is applied in figure 2 and a 50% correction factor is applied in figure 3. The recommended fish consumption rate of 57 gms/day is also illustrated on both of these figures.

These figures show that the average fish consumption rates for the different ethnic groups generally fall within one standard deviation of the data. Thus any difference between the ethnic groups appears to be more a reflection of the small sample size than a true difference between the groups.

It is also clear from Figures 2 & 3 that we do not have a sufficiently sized data set at this time to derive Duwamish/Elliott Bay consumption rates for individual API ethnic groups.

- ❖ **Does the SAB concur that pooling data from the individual ethnic groups is appropriate given the limitations of this data set?**

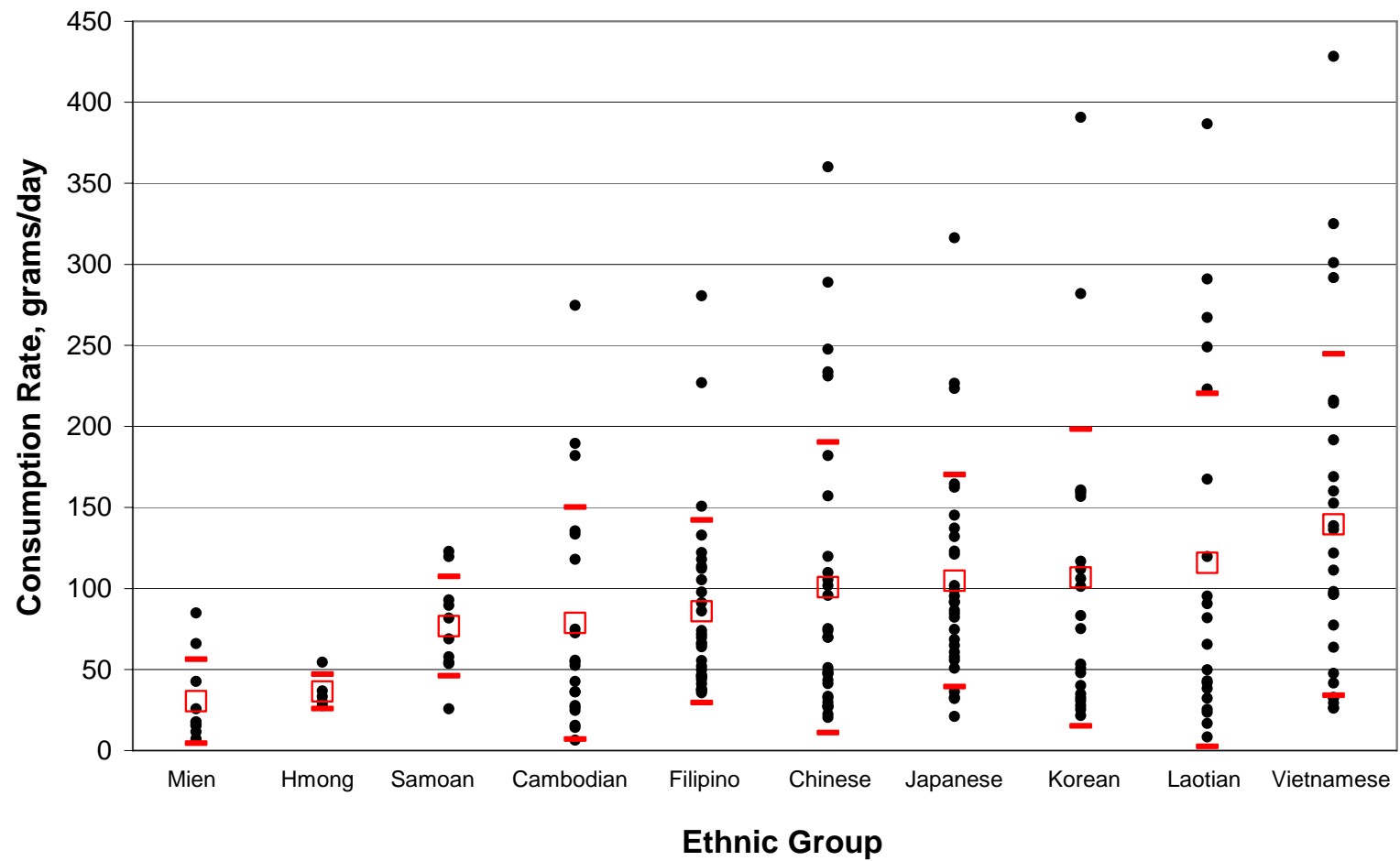
Conclusion

- ❖ **Does the SAB concur that the following recommendations are within the range of scientifically defensible values?**

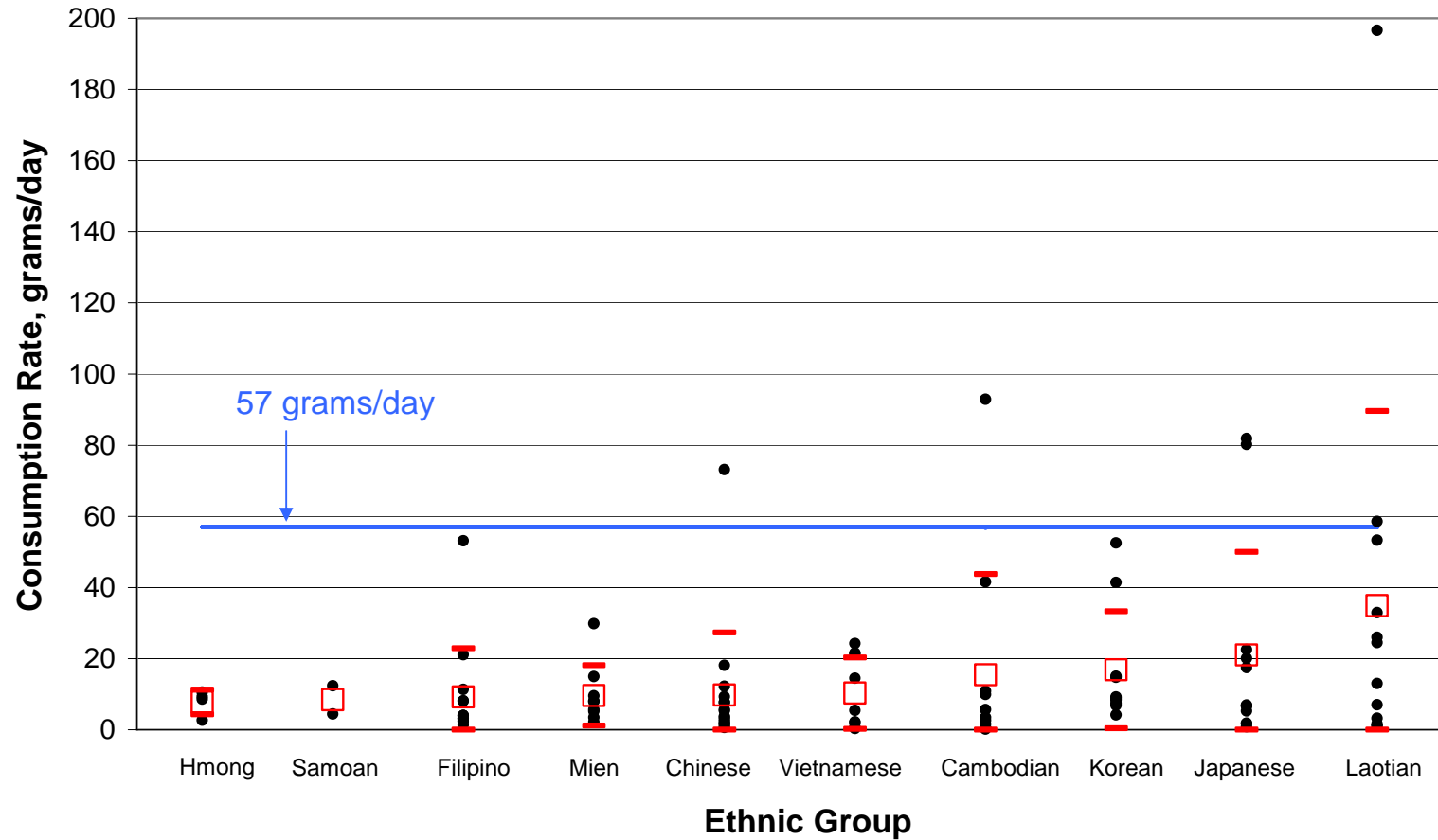
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Figure 1: Total Seafood Consumption, Average & Standard Deviation



**Figure 2: Consumption Rates for Fish Harvested from King County
(with 25% Cooking Correction Factor for Shellfish)**



**Figure 3: Consumption Rates for Fish Harvested from King County
(with 50% Cooking Correction Factor for Shellfish)**

